DRAFT
ENVIRONMENTAL ASSESSMENT

J. PERCY PRIEST RESERVOIR, TENNESSEE
WATER SUPPLY STORAGE REALLOCATION

April 2001

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Acronyms and Abbreviations

ADD	Area Development District
APE	Area of Potential Effect
BMP	Best Management Practices
cfs	cubic feet per second
CUD	Consolidated Utility District
dbh	diameter at breast height
EA	Environmental Assessment
ERGO	Environmental Review Guide for Operations
ESA	Environmental Site Assessment
FIRE	Fire, Insurance, and Real Estate
FWCA	Fish and Wildlife Coordination Act
MSA	Metropolitan Statistical Area
mgd	million gallons per day
M&I	Municipal and Industrial
NEPA	National Environmental Policy Act
Ngvd 1929	national geodetic vertical datum of year 1929
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O&M	Operations and Maintenance
ppm	parts per million
RBP	Rapid Bioassessment Protocol
RM	River Mile
SEPA	Southeastern Power Administration
SHPO	State Historic Preservation Office
TEAM	The Environmental Assessment and Management
TDEC	Tennessee Department of Environment and Conservation
TDNH	Tennessee Division of Natural Heritage
TMDL	Total Maximum Daily Load
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
CORPS	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WPA	Works Project Administration
YMCA	Young Men’s Christian Association

EXECUTIVE SUMMARY

The J. Percy Priest Reservoir is situated in the three-county area close to Nashville, Tennessee, and other communities. The authorized purposes of the reservoir are flood control, hydropower production, and recreation. This region has experienced significant population and industrial growth in the past decade, and the area continues to enjoy the prosperity associated with this growth. A result of this growth has been a significant demand and increase in the water needs of the population. To meet the finished water needs of the Municipal and Industrial (M&I) users several municipalities and a utility district have requested additional withdrawals from the J. Percy Priest Reservoir. In 1998, the Nashville District, U.S. Army Corps of Engineers (Corps) completed an evaluation in response to the requests for water withdrawal from the reservoir. The findings determined that sufficient surplus water exists in the reservoir to meet the requests of the M&I water users on an interim basis, while still fulfilling the operating objectives of the reservoir. The Nashville District has established a temporary water surplus contract with the City of Murfreesboro, Tennessee to locate a new intake in J. Percy Priest Lake. This contract:

- allowed the Nashville District to process the request for a new withdrawal, ensuring safe and reliable water sources for M&I users until decisions are made on reallocation of storage for more permanent water supply
- provided a source of revenue to the U.S. Government for the sale of surplus water as mandated by Public Law 78-534 (1944 Flood Control Act)

The current Environment Assessment (EA) is being prepared to evaluate the impacts of permanent reallocation of storage in J. Percy Priest Lake from one of the originally authorized purposes to that of water supply. Reallocation of storage on a permanent basis would entail designating a portion of the available storage in the reservoir for M&I water withdrawals. Parties wishing to use any of this storage would be required to enter into a contract with the government to purchase sufficient storage to meet their current and anticipated needs. The water supply reallocation contract is for storage necessary to provide a specific yield with 98% reliability during a 50-year drought. The contract fee is for a one-time purchase of storage in the lake plus annual payments for a prorated share of operation and maintenance costs associated with storing water in the lake. In addition, the Corps recommends that each M&I user establish a sinking fund to cover future repair and rehabilitation to the project. Permanent reallocation of storage for water supply is authorized by Title III of Public Law 85-500 known as the 1958 Water Supply Act.

This EA was prepared pursuant to the National Environmental Policy Act (NEPA), Council for Environmental Quality (CEQ) regulations implementing NEPA (40 CFR, 1500-1517), and Corps of Engineers Regulations ER 200-2-2 Policy and Procedures for Implementing NEPA (33 CFR, 230). The EA was prepared to describe existing conditions and evaluate potential impacts associated with the Proposed Action and alternatives. The alternatives considered in this EA are permanent reallocation of storage and "no action." "No action" would result in no permanent reallocation of storage for water supply and would require current and future users to develop other sources of water. Agency coordination and compliance issues have been identified and initial contacts made with the appropriate agencies. Input on scoping and public concern issues have also been solicited and considered in preparation of the EA.

Natural resources, including water quality, were evaluated using historical data from a variety of sources. The Proposed Action of reallocating water storage is not expected to significantly impact the natural resources of the reservoir. Under conditions similar to the drought of record, the maximum reservoir drawdown expected would be approximately 1 foot, and only locales having very shallow water could experience some temporary loss of aquatic habitat from the fluctuating water level. This area would be very small when compared to the available habitat of the entire reservoir, and any temporary loss of habitat would not significantly impact the aquatic community of J. Percy Priest Reservoir.

Protected species on either federal or state lists near the study area would not be affected by the Proposed Action since they are located out of the influence of the water level fluctuations.

J. Percy Priest Reservoir, surrounding Corps project lands, and Long Hunter State Park are utilized extensively by recreation enthusiasts in the area. The Proposed Action could negatively impact the use of Couchville Lake in Long Hunter State Park since this lake is influenced by the water levels in J. Percy Priest Reservoir. Any impacts would be associated with boating enthusiasts who use the lake, and only the shallower areas in the littoral zone would be affected. Extensive trails and pathways in the park would not be affected, and continued use of these facilities would be uninterrupted.

The Proposed Action is the best and most cost-effective approach to meet the water needs of the M&I users in the region.

1.0 INTRODUCTION

The United States Army Corps of Engineers' (Corps') role in managing water supply originated with Public Law 78-534 (1944 Flood Control Act), which authorized the Secretary of the Army to enter into surplus water agreements for domestic, municipal, and industrial (M&I) uses. The subsequent Public Law 85-500 (1958 River and Harbor Act) gave the Corps authority to include M&I water storage in reservoir projects and to reallocate storage in existing reservoirs from other uses to M&I uses, providing that the project's objectives are not seriously affected. Throughout the United States, the Corps has about 240 domestic and M&I water supply contracts spread over 117 different projects, accounting for several million acre-feet of storage.

The Nashville District of the Corps has allowed over 60 M&I water intakes to be placed in the ten reservoirs under its jurisdiction without having water supply contracts. The only contract in the Nashville District was with Cookeville, TN, and expired 3/31/98. In the interim, until all reallocation studies can be completed, the Nashville District is meeting the needs of M&I users through a determination that some of the water storage is "surplus" to the needs of reservoir system. The "surplus" water can be defined as not being needed on a short-term basis to carry out the authorized purposes of the reservoir. The Corps recognizes that the long-term solution is to permanently reallocate some reservoir storage for M&I water supply, and that hydrological studies will need to be completed to evaluate the water reallocation.

The existing conditions and potential impacts of the proposed alternatives of water reallocation for the J. Percy Priest Reservoir are presented in this Environmental Assessment (EA). The EA was prepared pursuant to the National Environmental Policy Act (NEPA) CEQ regulations (40 CFR, 1500-1517) and the Corps implementing regulation, Policy and Procedures for Implementing NEPA, ER 200-2-2, l988.

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2.0 PURPOSE OF AND NEED FOR ACTION

2.1 NATURE OF THE PROBLEM

J. Percy Priest Reservoir is located southeast of Nashville, Tennessee, in Davidson, Rutherford, and Wilson Counties (Figure 1). Authorized purposes are flood control, hydroelectric power production, and recreation, but it is also used for M&I water supply, water quality, fish, and wildlife. It covers an area of 14,200 acres during the months when recreational use is greatest.

Due to the exceptional growth in population in the vicinity of J. Percy Priest Reservoir, water withdrawal proposals have been made, and more are anticipated to meet the increasing water needs for M&I customers. Several adjacent municipalities and other organizations have requested additional water storage withdrawals from J. Percy Priest Reservoir for increasing finished water supply demands in the area. In response to a request from the City of Murfreesboro, Tennessee, the Nashville District prepared the *Reallocation Report for Water Supply Storage on J. Percy Priest*, Corps, 1998 (Reallocation Report). The report provides background information and addresses future water needs of other cities and entities in the watershed of the reservoir. Some of the cities and other entities have requested increased water withdrawal, while others have identified the need for a new water intake. The findings of the Corps report, incorporated herein by reference, provide the rationale for reallocating storage for the water supply while still fulfilling authorized purposes for the reservoir. As a summary, the following entities, and the amount of water requested from J. Percy Priest Reservoir include:

- City of Murfreesboro, Tennessee – 18.6 million gallons per day (mgd)
- Town of Smyrna, Tennessee – 18.3 mgd
- City of La Vergne, Tennessee – 10.0 mgd
- Consolidated Utility District (CUD), Murfreesboro, Tennessee – 11.0 mgd
- Young Men’s Christian Association (YMCA), Nashville, Tennessee – 0.08 mgd

The locations of water intakes are shown on Figure 2.

2.2 RESERVOIR OPERATIONS

Construction of J. Percy Priest Reservoir was initiated in 1963 and the dam and power plant were completed in 1969. The project has been in full operation since 1971. Originally authorized project purposes were flood control, hydroelectric power production, and recreation; management of water quality, fish, and wildlife were later added. The project is currently managed and operated for all of these purposes.

The reservoir is operated so that the maximum benefits of flood control, hydroelectric power generation, and recreational use are accomplished. The current operation allows for maximum storage capacity during the winter months when precipitation and runoff are greatest, and provides for a full recreation pool during the warmer months when recreational use is greatest (Figure 3).

Since recreation is one of the primary objectives in operation of the reservoir, a stable pool at 490 feet national geodetic vertical datum of 1929 (ngvd 1929) is maintained with relatively little fluctuation during the months of heaviest visitation (April through October). The agreement between the Corps, the Tennessee Valley Authority (TVA), and the Southeastern Power Administration (SEPA) allows a fluctuation in the summer recreation pool between 489.5 feet and 490.5 feet ngvd 1929. Although the effects of the one-foot fluctuation in summer pool elevation on most recreational activities appear to be minimal, the shoreline vegetation is adversely affected if the pool elevation remains above 490 feet for more than 2 or 3 days. Flooding above 490 feet ngvd 1929 is prevented as much as possible during the recreational season. In cooperation with the Tennessee Wildlife Resources Agency (TWRA), the pool level is stabilized to the extent practicable during the fish-spawning season.

Drawdown operations for power production and flood storage capacity to winter pool at 483 feet ngvd 1929 usually commence when visitation declines in October. Winter drawdown results in the development of mudflats, rocks, and other substrates, particularly in embayments and the upper portions of the lake. Fluctuations due to power production may result in water levels at minimum power pool of 480 feet ngvd 1929; this occurs very rarely.

The east and west forks of the Stones River are the primary sources of inflow to the lake. During extremely dry years, which are seldom, lake inflows can be insufficient to raise the pool to summer recreation pool level or to maintain that level. During such extreme events, losses due to surface evaporation, seepage, and sinkholes in the reservoir often exceed inflows to the reservoir, resulting in the inability to maintain summer recreation pool level. Further reduction in elevation for any purpose could cause a lowering of the summer recreation pool level for the remainder of the recreation season, potentially adversely affecting recreational activities, water quality, and aquatic resources in the reservoir and in the tailwaters downstream in the Stones River.

2.3 ISSUES AND OPPORTUNITIES

The M&I water users in the project area are experiencing rapid population growth and an increased demand for water. The District has conducted an engineering water reallocation evaluation that presents several options for the various entities to meet the increased demand for water (Reallocation Report). This evaluation was prompted by a request from the city of Murfreesboro. In addition, the Reallocation Report addressed the additional water needs of several cities and a utility including: the City of La Vergne, Town of Smyrna, Consolidated Utility District, the Young Men’s Christian Association, and estimates for other unidentified new water users. The additional water that would be withdrawn from the J. Percy Priest Reservoir would come from the storage capacity of the reservoir as it relates to the hydropower pool. Water stored in this pool also provides support for other uses including recreation, fish and wildlife, and water quality purposes.

Implementation of the Proposed Action accomplishes the following:

- complies with the mandate for assessing storage charges in reservoirs as specified in Public Law 85-500
- allows the cities and communities an opportunity to obtain storage to meet their growth demands in a cost-effective manner
- balances water supply with the authorized purposes of flood control, hydropower production, and recreation; and with water quality management
- distributes the proportional cost of operation and maintenance on the portion of the storage capacity among all joint uses
- provides water users permanent water storage

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3.0 ALTERNATIVES CONSIDERED

Several alternatives were evaluated and dismissed from detailed consideration as described in the Reallocation Report and as summarized below:

- enlarging Walter Hill Reservoir, which would take a considerable amount of time to accomplish and would require extensive engineering, hydrological, geological, and environmental evaluations; the cost/benefit ratio would be low and because this is not a Corps reservoir, the Corps currently does not have authority to implement these modifications. Also, this would only benefit Murfreesboro, TN.
- constructing another dam and reservoir upstream, which would be cost prohibitive
- installing a water intake on the Cumberland River, Center Hill Reservoir, or the Duck River, which would be cost prohibitive
- using groundwater, which is not an attractive alternative, since it is limited in availability
- reusing treated wastewater, which would require additional treatment costs; also, public reluctance to accept this water reuse alternative is anticipated
- purchasing water from other entities, which is cost prohibitive, since new water transmission lines would need to be constructed

These alternatives were thoroughly evaluated from technical, permitting, and cost/benefit considerations and were not deemed feasible; therefore, they are not discussed further in this EA.

Based on the results of the evaluations described in the Reallocation Report, the two alternatives that are being considered are the Proposed Action (Water Supply Storage Reallocation), which would meet the current and projected demand for water, and the No-Action Alternative. Existing environmental conditions related to these alternatives, and the potential impacts resulting from the implementation of the Proposed Action and the No-Action Alternative are presented in this EA.

3.1 PROPOSED ACTION: WATER SUPPLY STORAGE REALLOCATION

Reallocated water supply storage would come from available storage in the reservoir as determined by the extreme drought conditions in the area for the period of record and the level of the hydropower pool for water supply. The extreme drought occurred in 1953 (prior to impoundment of the Stones River) when the hydropower pool would have been at the level of 483.0 ngvd 1929. Between the elevations of 483.0 and 480.0 there are 34,000 acre-feet of available water stored in the hydropower pool that could be reallocated. The amount of storage that is needed by M&I users, as discussed in Section 2.1, is 17,433 acre-feet. Under this scenario of water reallocation the reservoir drawdown that would be experienced is expected to be about 1.0 foot. During the time of the year (May – October) when the water level is the highest, drawdown of the reservoir would be even less.

M&I users would be required to enter into a contract to purchase water storage and pay a portion of future annual O&M costs of J. Percy Priest. Storage costs are determined based upon the higher of:

- **hydropower benefits foregone –** the lost benefits to electrical customers resulting from water being diverted from the reservoir for water supply rather than passing through a hydropower plant and a loss in dependable capacity at the project (due to loss of head or loss of full capacity during low-flow periods).
- **hydropower revenues foregone –** the value of the lost power based on the marketing agency's current rates.
- **hydropower replacement –** the cost of replacement power.
- **updated cost of storage –** the portion of total project construction cost, updated to current price levels, which will be paid by each water supply user based on its percentage of the total storage reallocated for water supply.

3.2 NO-ACTION ALTERNATIVE

This alternative consists of no change in the current water allocation. No water would be allocated for water supply. Existing users would be forced to find alternate water supplies for M&I needs.

4.0 AFFECTED ENVIRONMENT

The J. Percy Priest Reservoir is located southeast of Nashville in north central Tennessee, primarily within Davidson and Rutherford counties with a small portion within Wilson County. The dam is located at River Mile (RM) 6.8 on the Stones River, a tributary of the Cumberland River. The reservoir is within 15 miles of the center of Metropolitan Nashville. Other population centers near the reservoir include Smyrna, La Vergne, and Murfreesboro. For purposes of this EA, the study area extends downstream of the J. Percy Priest Dam to the U.S. Highway 70 (Lebanon Road) Bridge on Stones River, and upstream of the dam to the Highway 231 Bridge on East Fork Stones River, Nice Mill on West Fork Stones River, and the Gladeville Pike crossings of Spring and Fall Creeks (Figure 1).

The reservoir extends the entire 31.9 miles of Stones River above the dam, and another 10.0 and 6.3 miles, respectively, along the East and West Forks at the top of flood control pool [504.5 feet ngvd 1929]. With its many inlets and embayments, the reservoir exhibits a dendritic pattern. Islands cover almost four percent of the surface. Figure 3 presents the J. Percy Priest Reservoir operating levels; a summer recreation pool at 490 feet ngvd 1929 is held, varying slightly from 489.5 feet to 490.5 feet ngvd 1929, from May through October. At summer recreation pool, the reservoir has a surface area of 14,200 acres and shoreline length of approximately 213 miles. During winter, the pool is generally maintained around 483 feet ngvd 1929. In the flood season from December through March, space for flood control storage is provided between 483 feet and 504.5 feet ngvd 1929.

The lower portion of the reservoir, from the dam site to the Fate Sanders Bridge, is characterized as wide and deep, and more suitable to intensive recreational development. This portion of the reservoir is also closer to the urban center of Nashville and the major transportation routes. The upper portion of the reservoir, extending from the Fate Sanders Bridge to Walter Hill Dam on East Fork Stones River and to Nice Mill Dam on West Fork Stones River, is narrower and shallower, transitioning to riverine characteristics.

4.1 PHYSIOGRAPHY

J. Percy Priest Reservoir is located within the Nashville Basin Section of the Interior Low Plateau Physiographic Province. The Nashville Basin is a nearly elliptical area enclosed by the Highland Rim. The Nashville (or Central) Basin was formed by erosion of the Nashville Dome, a low structural dome that makes up the structural and geographic center of the Basin. The dome represents the southern end of the Cincinnati Arch, an elongated area of upwarped rocks that extend into Tennessee. During the upwarping and doming, the rocks at the crest of the dome were stretched, resulting in the formation of joints. The weakened carbonate rocks were readily subject to solution and erosion, resulting in a topographic basin that now occupies the top of the structural dome. The Basin is characterized by calcium carbonate sedimentary rocks of Ordovician age. These sedimentary rocks comprising the Nashville Basin include limestone, shale, dolomite, siltstone, sandstone, and claystone.

According to the Soil Survey of Davidson County, Tennessee [U.S. Department of Agriculture (USDA), Soil Conservation Service, February 1981], the vicinity of the reservoir is characterized by gently rolling to very hilly terrain, with some level areas, and by meandering low-gradient streams. Numerous rock outcrops and sinkholes are present in this region. Sinkholes are formed by the collapse of underground cavities dissolved out of limestone by the flow or percolation of subsurface water streams and seepages. In areas where such sinks are common, the terrain is referred to as karst topography.

4.2 AQUATIC RESOURCES

The information presented herein includes data from the following trophic levels: phytoplankton, benthic macroinvertebrates, and fish. Data from 1996 and 1997 for the phytoplankton and fisheries are included; and benthic macroinvertebrate data from 1994 and l995 are presented. To summarize the data in a concise manner, the information presented herein was taken from selected stations that represent the upper, middle, and lower sections of the reservoir. Details of these studies are presented in Appendices 1-4 and are summarized in the following sections.

4.2.1 Phytoplankton

Phytoplankton are microscopic free-floating organisms which make up an important component of the aquatic ecosystem. They are primarily producers, occupy the lowest trophic level in the food web within the aquatic environment, and are consumed by many types of higher life forms, including macroinvertebrates and fish. The general health and physical well-being of consumers are directly or indirectly dependent on phytoplankton.

In addition to the biotic relationships of phytoplankton, numerous abiotic factors are also of importance. Knowledge of phytoplankton species composition is useful in interpreting water quality and predicting potential problems concerning nuisance algal growths. Nuisance algae can cause water taste and odor problems, and bio-fouling in filters, screens, pumps, and other types of water handling equipment.

The results of the phytoplankton surveys are presented in Appendix 1. During both years analyzed, the number of taxa collected in the reservoir ranged from a low of 12 to a high of 26; and densities ranged from a low of 81 per milliliter at Station 5 during June 1997 in the upper end of the reservoir to a high of 3,096 per milliliter at the same station in September 1997. The fluctuation in numbers of taxa and density are not uncommon and represent seasonal differences. The taxa present in J. Percy Priest Reservoir are common throughout all of the Cumberland River Basin Lakes, and the communities that are present can be considered typical for the water body.

4.2.2 Benthic Invertebrates

The primary objective of the benthic invertebrate assessment was to determine the community structure of this trophic level in the five major tributaries of J. Percy Priest Reservoir. Benthic invertebrates are bottom-dwelling organisms that are relatively sedentary and reflect the physical and chemical characteristics of their environment. The invertebrates thus reflect the overall ecological integrity and are indicative of environmental conditions of the reservoir. They serve as an important forage base for fish and other fauna. Results of the invertebrate sampling are presented in Appendix 2.

Collections indicate the invertebrate community is diverse and is comprised of a total of 189 taxa, belonging to 14 major groupings. Invertebrates are represented by both pollution-tolerant and sensitive organisms that are usually associated with cleaner, pollution-free water. While significant differences occur in species composition and relative abundance among the tributaries, many similarities also occur. Various combinations of mayflies, caddisflies, chironomids, and snails comprised most of the invertebrate community at each location during all seasons. Variations in relative abundance and composition accounted for differences among stations and seasons. Similarities between the East Fork Stones River, West Fork Stones River, and Fall Creek were prevalent in species composition and abundance when compared to Hurricane Creek and Stewart Creek. Differences in the species composition can be attributed to the substrate type; in the East and West Forks of the Stones River, the substrate consists of cobble and gravel, which is the preferred habitat for many species. In Stewart and Hurricane Creeks the substrate is comprised primarily of limestone bedrock, and usually results in a lower species diversity and number of taxa.

The invertebrate communities in the waterbodies sampled are diverse and are represented by different groups; and most major groups of invertebrates normally expected are represented in collections. Numbers of organisms are generally high, which is indicative of the overall high productivity of the drainage basin. Differences among various sections of the reservoir in species composition and diversity are reflective of substrate conditions and available habitat.

4.2.3 Fish

The fish community is the highest trophic level of the aquatic resources, and is the most visible from the general public perspective. The primary objective of the assessment of the fish community is to identify what species are present and the relative abundance of important species. The TWRA Fisheries Division manages J. Percy Priest Reservoir as specified in Part 1 – Natural Resources Management of the Operational Management Plan for J. Percy Priest Lake.

J. Percy Priest Reservoir fisheries are typical of those found in the Southeastern U.S. (Appendix 3). The species composition consists of 23 species from the forage fish category; these include species that provide a forage base for some of the larger species, and consist of minnows (*Cyprinidae*), shad (*Clupeidae*), suckers (*Catostomidae*), and smaller representatives of the catfish family (*Ictaluridae*). The rough fish category includes 30 species and consists of suckers, catfish, gar (*Lepisosteidae*), and others. The game and sport fish include several species of black bass (*Micropterus spp*.), white and black crappie (*Pomoxis annularis, P. nigromaculatus*), bluegill (*Lepomis macrochirus*), and other species of sunfish (*Lepomis spp*.). The largemouth bass (*Micropterus salmoides*) is the dominant bass in the reservoir, and is a highly esteemed fish that is sought after by anglers. Black and white crappie are also highly esteemed sport fish, and are considerably sought after. As part of the management practices carried out by the TWRA, fish stocking is carried out each year, and several thousand fry and fingerling rockfish, striped bass, and hybrids are introduced to the reservoir.

4.3 WATER QUALITY

Extensive physical and chemical data have been collected on streams flowing into the reservoir and on the J. Percy Priest Reservoir. Information has been collected for more than two decades at several sampling stations; for purposes of this report selected water quality parameters representing physical and chemical parameters, heavy metals, and organic measurements are summarized from six stations and presented in Appendix 4. These stations represent the upper, middle and lower sections of the reservoir and include the major tributaries; the data are considered to be representative of the entire water body and provide a historical perspective of the water quality. Water quality data from the selected stations and their locations include:

- Station 3J. Percy Priest Reservoir10001 – Lower section of the reservoir at the dam
- Station 3J. Percy Priest Reservoir20003 – Middle section of the reservoir
- Station 3J. Percy Priest Reservoir20005 – Upper section of the reservoir below confluence of East Fork Stones River and West Forks Stones River
- Station 3J. Percy Priest Reservoir10015 – Upper section of the reservoir on West Fork Stones River below the confluence of East Fork Stones River and West Fork Stones River
- Station 3J. Percy Priest Reservoir10016 – Upper section of the reservoir on the East Fork Stones River
- Station 3J. Percy Priest Reservoir10035 – Upper section of the reservoir on Stewart Creek

J. Percy Priest Reservoir is a moderately deep, temperature-density stratified storage reservoir. Stratification in the reservoir begins in early spring and continues until late October. During the period of thermal stratification, rapid depletion of dissolved oxygen occurs below a depth of 20 – 25 feet. The oxygen depletion is caused in part by the nutrient loading coming into the reservoir from the tributary streams in the Stones River watershed, which contributes to the overall enrichment of the reservoir. The sources of nutrients include phosphate-bearing natural formations and various wastewater treatment plants whose effluents enter flowing streams. Agricultural activities and runoff from urban areas also contribute to the nutrient loading of the reservoir. The amount of nutrients also contributes to the presence of algal blooms, which can cause oxygen depletion. The upper stratum of water contains oxygen well above the recommended level of 5.0 milligrams per liter (mg/L), as specified by the Tennessee Department of Environment and Conservation (TDEC), and is able to support the aquatic organisms that are present. In general, the water quality in J. Percy Priest Reservoir is adequate to support aquatic life; however in the deeper strata during the time of reservoir stratification, low dissolved oxygen conditions occur. Metals, primarily iron and manganese can occur in high concentrations, and can stay in solution during anaerobic and/or stratified conditions; this situation can pose potential problems for downstream water users, and aquatic organisms during hydropower releases. Further, due to anaerobic conditions at depths greater than 15 to 25 feet when the reservoir is stratified, desirable aquatic life is confined to the upper layers of water.

4.4 WETLANDS

Fluctuation between summer recreational pool elevation and winter pool elevation inhibits the growth of most native shoreline aquatic and wetland plants. Plants that would normally grow in water along the shoreline would be completely stranded in the fall and totally submerged in the spring. As a result, only a few plants live in this type of environment and virtually no significant wetland areas have developed below summer pool elevation at 490 feet ngvd 1929. Because of the ability to endure partial inundation yet also grow well on relatively dry land, willows (*Salix* spp.) often thrive at the higher edges of summer pool elevation. A strongly colonial herbaceous species, waterwillow (*Justicia americana*), is ubiquitous in a narrow shallow-water zone along the margins of the summer pool elevation. Some bald cypress (*Taxodium distichum*), planted by the TWRA to provide fish habitat, have survived along portions of the shoreline.

According to the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps that cover the J. Percy Priest Reservoir area, palustrine forested, scrub/shrub, and emergent wetlands are depicted along the shoreline of the summer recreation pool at or upslope of the 490-foot ngvd 1929 elevation. These wetland areas are located primarily at the head of coves and in the less steeply sloped areas, especially in the upper portions of the lake. However, it is unlikely that substantial areas would meet the criteria for jurisdictional (regulated) wetlands under the Corps 1987 *Wetland Delineation Manual*.

4.5 VEGETATION

The J. Percy Priest Reservoir area can be characterized as having a mixed mesophytic deciduous forest vegetation type. Although this is the climax forest for the region, the natural forests in the vicinity of the project area have several vegetation associations characterized by differences in the composition of the dominant canopy species. These differences are due to disturbances as a result of human activities and to changes in elevation, slope, aspect, and moisture regime. Most of the study area’s vegetation had been disturbed prior to land acquisition for J. Percy Priest Reservoir and now represents various successional stages. Forest communities along the shoreline of J. Percy Priest include upland hardwoods dominated by oak-hickory, red cedar stands in rocky and shallow soil areas, cove hardwoods, and wetland forest.

The upland hardwood vegetation type comprises the largest portion of the forests bordering the reservoir. Although it is the climax forest on uplands and upland slopes, the upland hardwood stands in the vicinity of the reservoir consist of secondary and tertiary growths of upland hardwoods interspersed among red cedar glades and former agricultural lands that are now undergoing natural secondary biotic succession. Trees commonly occurring within this forest type include the major oak species such as white oak (*Quercus alba*), black oak (*Quercus velutina*), southern red oak (*Carya falcata*), scarlet oak (*Quercus coccinea*), northern red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), chinkapin oak (*Quercus* *muehlenbergii*), and post oak (*Quercus stellata*); and several hickories such as mockernut (*Carya alba*), pignut (*Carya glabra*), bitternut (*Carya cordiformis*), and shagbark (*Carya ovata*). Other common components of this forest type are tuliptree (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), white ash (*Fraxinus americana*), hackberry (*Celtis occidentalis*), winged elm (*Ulmus alata*), American elm (*Ulmus americana*), American beech (*Fagus grandifolia*), and blackgum (*Nyssa sylvatica*). Common understory species associated with this type include flowering dogwood (*Cornus florida*), black cherry (*Prunus serotina*), sourwood (*Oxydendrum arboreum*), redbud (*Cercis canadensis*), persimmon (*Diospyros virginiana*), and eastern red cedar (*Juniperus virginiana*). This forest type occurs over a wide variety of sites ranging from moist, but well-drained lowlands to very dry sites on thinly soiled ridges. Tertiary upland hardwood stands that have resulted from succession of former crop or pasture fields often include sweetgum (*Liquidambar styraciflua*), flowering dogwood, hackberry, sassafras (*Sassafras albidum*), American basswood (*Tilia americana*), red mulberry (*Morus rubra*), Osage-orange (*Maclura pomifera*), sumac (*Rhus* spp.), and honeylocust (*Gleditsia triacanthos*) as important components.

Red cedar stands are usually found on areas where soil is thin and fertility is low, although they can also occur in all but the wettest bottomland sites. Although red cedar stands are usually homogenous, red cedars are often intermixed and associated with scrub hardwoods, broomsedge (*Andropogon virginicus*), and herbaceous plants. Red cedar is often the climax stage in plant succession at a site due to soil limitations such as low fertility or thin soils. At some sites, however, red cedar is just a stage in the natural succession to the final hardwood climax typical of the region. Red cedar stands comprise the majority of the forest types located in the vicinity of the reservoir.

An important vegetation type associated with red cedar habitat is the cedar glade, which is dispersed throughout the J. Percy Priest area. Cedar glade habitat occurs primarily on outcroppings of Lebanon limestone. This ecosystem is botanically unique, with many endemic plant species that have adapted to the characteristic thin and rocky soils and extremes in moisture availability and temperatures. Since the shallow soil and Lebanon limestone severely limits the growth of trees, the trees that occur in this habitat are usually widely spaced and interspersed with bare rock and herbaceous ground cover. A typical combination of trees found in glades is red cedar, winged elm, and dwarf hackberry (*Celtis tenuifolia*). Other common trees include post oak, pignut hickory, and ashes (*Fraxinus* spp.). Common shrubs include glade privet (*Forestiera ligustrina*), common snowberry (*Symphoricarpos albus*), cedarglade St. Johnswort (*Hypericum frondosum*), and fragrant sumac (*Rhus aromatica*).

Cove hardwood communities are located in the more moist habitats of upland coves or hollows and lower slopes and consist mainly of Tuliptree, northern red oak, white oak, black walnut, black cherry, cucumbertree (*Magnolia acuminata*), and black locust. Cove hardwood communities occur on a small percentage of project lands.

Wetland forest communities occur in the lower, more level areas adjacent to the shoreline at or upslope of the 490-foot ngvd 1929 elevation. Due to the average 7-foot variation in pool elevation, the growth of most submerged and emergent native vegetation below summer recreational pool is inhibited. Common trees comprising these communities include black willow (*Salix nigra*), river birch (*Betula nigra*), cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), boxelder (*Acer negundo*), hophornbeam (*Ostrya virginiana*) and sugarberry (*Celtis laevigata*).

4.6 THREATENED AND ENDANGERED SPECIES

A review of the databases maintained by TDEC, Division of Natural Heritage (TDNH), indicates recorded occurrences of federally and state-listed endangered and/or threatened species of conservation concern adjacent to and in the vicinity of the J. Percy Priest Reservoir. However, these species are recorded as historically being present outside the 14,200-acre summer recreational pool of J. Percy Priest Reservoir.

The impoundment of Stones River to form J. Percy Priest Reservoir altered the original flowing-water habitat to a standing water, lacustrine habitat unsuitable for aquatic species requiring riverine habitats. As a result, species that require swift-flowing habitat do not occur in the reservoir. Two such species, the federally endangered tan riffleshell (*Epioblasma florentina walkeri*) and yellow-blossom pearlymussel (*Epioblasma florentina florentina*), are historically recorded as occurring in the East Fork Stones River, but upstream of the impounded area of J. Percy Priest Reservoir in the tailrace below the dam at Walter Hill Reservoir.

Much of the terrain surrounding J. Percy Priest Reservoir lies in the cedar glade ecosystem of middle Tennessee. The cedar glades contain plants that are unique to the region and represent an ecologically important botanical assemblage. The cedar glades have been the subject of detailed floristic studies and continue to be utilized by botanists to study many facets of glade ecology and flora. A number of glade plants that occur in the vicinity of J. Percy Priest Reservoir have been listed by the USFWS as threatened or endangered, including Tennessee coneflower (*Echinacea tennesseensis*), Price's potato-bean (*Apios priceana*), and leafy prairie-clover (*Dalea foliosa*). However, the cedar glades in the vicinity of J. Percy Priest Reservoir are located above the elevation of the summer recreational pool.

Prairie rockcress (*Arabis* perstellata), listed by the USFWS as endangered, occurs on moist limestone outcrops within project lands on the banks of the East Fork Stones River. A federal candidate species, Stones River bladderpod (*Lesquerella stonensis*), occurs in fields on project lands along the East Fork Stones River arm of the reservoir.

A list of rare plant and animal species known to occur in Davidson, Rutherford, and Wilson Counties that are classified as endangered or threatened by the USFWS and protected by the Endangered Species Act of 1973, or are state-listed species of conservation concern and protected by Proclamation of the TWRA, is presented in Appendix 5.

4.7 RECREATION

One of the project's primary purposes is to meet existing and projected recreation needs for the region. The significant increase in population of the region and the proliferation of residential development has placed a high demand on the recreational resources of the reservoir and surrounding area. Recreational resources are managed to accommodate the use and demand experienced.

The Nashville District operates 20 recreation areas on the reservoir's shoreline. Facilities offer a variety of recreational uses, including boating, fishing, swimming, camping, picnicking, and hiking. Four commercial marinas are located on the reservoir.

The 2,600-acre Long Hunter State Park, which includes a separate 110-acre sinkhole lake that is directly influenced by fluctuations in the reservoir and is part of the J. Percy Priest project, is situated approximately six miles north of La Vergne along the eastern shoreline of the reservoir. The activities that recreation enthusiasts can enjoy at this location include picnicking, swimming, fishing, boating, hiking, and wildlife viewing.

The 790-acre Hamilton Creek Park, located on the west shore off Bell Road, is a city park maintained by the Metropolitan Government of Nashville-Davidson County.

The J. Percy Priest Wildlife Management Area is an extensive area that encompasses more than 10,000 acres and is divided into different units. These units are managed for different purposes including wildlife habitat enhancement and management, public appreciation, enjoyment of the outdoor experience, dog training, and hunting. These areas are jointly managed by the TWRA and the Corps.

4.8 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 requires that Federal agencies take into account the effects of its undertakings on historic properties included in or eligible for listing in the National Register of Historic Places. In accordance with 36 CFR 800.16(y), the proposed activity is an undertaking by definition; however, it is an undertaking with no potential to affect historic properties. Project documentation was provided to the Tennessee State Historic Preservation Officer (SHPO) during environmental scoping.

4.9 HEALTH AND SAFETY

Public safety at J. Percy Priest is a primary concern. J. Percy Priest Lake is in a major metropolitan area and receives very heavy visitation. During fiscal year 1998, 27.7 million visitor hours were recorded at the project. This high number of visitors results in intense use of the lake and recreation areas.

The lake was designed to have a normal summer pool elevation of elevation 490 feet ngvd 1929 and winter pool elevation of 483 ngvd 1929. Boat ramps are designed to accommodate launching within these pool elevations. Boaters are encouraged to follow safe-boating practices and be alert for underwater hazards such as submerged stumps, logs, and rocks.

Buoys are used to mark the lake's primary water safety hazards, such as the dam, rocks, shallow areas, and swim areas. Navigation buoys mark the channel from Hobson Pike upstream and downstream of Hobson Pike on some points where water depth is a concern. Marinas are marked with slow, no wake buoys.

Shallow area markers made with carsonite posts are used to supplement the buoys. These markers are used to indicate shallow areas and rocks and provide boaters with additional information of the location of potential water safety hazards. The carsonite posts are flexible so they bend if a boater inadvertently hits one.

Park rangers patrol the project to provide visitor assistance and ensure public safety. Law enforcement agreements with Metro Nashville Police Department and Rutherford County Sheriff's Department provide additional patrols for public safety by law enforcement officials. Tennessee Wildlife Resources Agency patrols the lake for boating safety.

Park rangers provide educational programs to local schools and civic groups on a variety of lake-related topics including water safety. The visitor center has safety exhibits and water safety brochures available. The rangers periodically staff exhibits at local malls and boat shows to promote water safety. News releases and newsletters are issued to encourage the public to practice safety during their visit to the lake.

Since its impoundment in 1968, 123 public fatalities, most of them water-related, have occurred at J. Percy Priest Lake. During the period 1990-1999, there were 21 public fatalities. Although this was 21 too many, it was half the number of the previous 10-year period. This reduction in fatalities was during a period that visitation increased, perhaps indicating the public was becoming more educated in water safety.

Activities of the victims included swimming, falling from boats, diving or jumping into the water, falling in while bank fishing, riding personal water craft, and children that were left unattended. None of the victims were wearing life jackets. Although exact data are not available on how many of the fatalities were alcohol related, some officials think the numbers may be as high as 50%.

The Corps has an environmental program to provide protection of natural resources and safety for visitors and workers. The Environmental Assessment and Management (TEAM) guide manual and the Environmental Review Guide for Operations (ERGO) are the primary resources used, however, all Federal, state and local laws are followed. The Corps staff includes an environmental protection specialist to monitor the environmental program.

There are no known permanent health assessments or advisories for the reservoir or the streams. However, during certain occasions problems have been associated with the sewage treatment facilities' inability to handle the volume of wastewater to be treated. Such was the case during the time of the field reconnaissance of the project area on October 2, 1998. The West Fork of the Stones River in the vicinity of Nice Mill was posted to avoid contact with the water due to inadequate sewage treatment from one of the local municipalities.

4.10 SOCIOECONOMICS

4.10.1 Population

Current, Historical and Projected Populations for Davidson and Rutherford Counties			
Census Year	**Davidson County**	**Rutherford County**	**Total Population**
1980	477,810	84.050	561,860
1990	510,780	118,570	629,350
1999	530,050	171,401	701,451
2005	558,770	193,071	751,841
2010	574,279	215,417	789,696
2015	589,702	238,922	828,624
2020	605,030	263,701	868,731

4.10.2 Economics

The area maintains a relatively diversified employment base with the service industry, retail trade, and the manufacturing industry as the leaders in employment. Other major industries include agricultural-related, construction, transportation, utilities, wholesale trade, finance and insurance, and government services. As of January 2000, the total civilian labor force in the study area totaled more than 400,000 individuals; this number is approximately 2.5% more than the previous census conducted in 1996. The unemployment rate for the study area is less than five percent, which is about two percent points below the state average. As of 1995, the per capita income level in the study area is $24,536, which is above the state average of $21,060.

4.11 LAND USE / AESTHETICS

The J. Percy Priest Reservoir is unique since it is situated near an urban population center, but has an undeveloped shoreline. However, major commercial developments are present southwest of the reservoir along U.S. Highway 41 towards Nashville; some commercial development exists north of the dam site along Stewarts Ferry Pike and Old Hickory Boulevard, and northeast of Smyrna, and near La Vergne. Some commercial development is near the Stewart Creek launching area, and the Smyrna airport is located in the vicinity.

Several new multi-family residential areas have recently been built, some are under construction, and several more are in the planning phase. Areas of development along the Smith Springs and Anderson Roads have a strong visual impact on the reservoir.

The shoreline of the reservoir is protected by the perimeter operational lands acquired under the Joint Interagency Acquisition Policy. The minimum acquisition policy guideline was the 508-ft. ngvd 1929 contour, or a line measured 300 feet horizontally from elevation 504.5 (top of the flood control elevation pool), whichever is greater. The Policy provides an opportunity for Corps personnel to fulfill the management objective of protecting the quality of the visual resources and the views of the reservoir. Under the guidelines of the Policy the extent of modifications to the area are limited, thereby reducing or avoiding the impact of the quality of the visual resource and providing the visitor an opportunity to enjoy the undisturbed visual resource that the reservoir provides. Other management objectives include implementing visual enhancement projects to improve area entrances and providing scenic vistas. These lands also serve as buffers and are able to trap nutrients and other pollutants before they enter the reservoir.

4.12 TRANSPORTATION

Major roadways in the vicinity of J. Percy Priest Reservoir include Interstate Highways 24 and 40, and U.S. Highway 70. These are supported by numerous state and county roadways that provide direct access to J. Percy Priest Reservoir and the associated recreational areas. CSX provides rail service to the area, while Smyrna Airport and Nashville International Airport provide air service.

The study area extends downstream of the J. Percy Priest Dam to the U.S. Highway 70 (Lebanon Road) Bridge on the Stones River; and upstream to Highway 231 Bridge on the East Fork Stones River; and to the Bridge crossing of the West Fork Stones River at Sulphur Springs Road near Nice Mill; and to the Spring Creek Bridge at the Gladeville Pike and the Fall Creek Bridge at Mona Road (Figure 1). No public transportation systems are available in the project area.

Neither Percy Priest Reservoir, nor the East or West Forks Stones River, are used for commercial navigation.

4.13 AIR QUALITY

The study area encompasses portions of three counties: Davidson, Rutherford, and Wilson. Air emission sources within the study area consist of a mix of industrial, commercial, and residential stationary sources, plus mobile sources (cars, trucks, etc.).

The counties in the study area are considered in attainment with national ambient air quality standards for which attainment designations have been issued.

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5.0 ENVIRONMENTAL CONSEQUENCES

5.1 PHYSIOGRAPHY

5.1.1 Proposed Action: Water Supply Storage Reallocation

Physiography would not be impacted by the Proposed Action.

5.1.2 No-Action Alternative

The No-Action Alternative would have no impact to the physiography.

5.2 AQUATIC RESOURCES

5.2.1 Phytoplankton

5.2.1.1 Proposed Action: Water Supply Storage Reallocation

Phytoplankton typically occupy open water areas away from the shallows, and should not be affected by the relatively minor water level fluctuations that might occur during extremely dry years. During these extremely dry years, however, phytoplankton densities would be expected to be lower than in normal years due to reduced nutrient input from local runoff.

5.2.1.2 No-Action Alternative

The No-Action Alternative would result in no change to phytoplankton other than reduced densities related to reduced nutrient input.

5.2.2 Benthic Invertebrates

5.2.2.1 Proposed Action: Water Supply Storage Reallocation

During extreme drought conditions, water level could drop by 1 foot or less. During these periods, there could be certain areas of the littoral zone that are dewatered, leaving less mobile benthic macroinvertebrates stranded and killed. The areas that could be most dramatically affected include the Stewart Creek and Vivrett Creek areas (see Figure 1). These areas are managed intensively for aquatic resources, and several fish attractors have been installed. The fish attractors include structures made of pipe, submerged brush, and tires. Surface areas of all of the structures serve as substrate for macroinvertebrates to colonize. If these submerged structures become exposed, even during brief periods due to water level fluctuations they become unsuitable habitat for invertebrates.

When water level drop and bottom areas are exposed, some invertebrates will burrow deeper into the substrate where conditions are suitable for their existence. Those that inhabit the artificial substrates such as pipe for fish attractors or the submerged brush that has been installed will likely migrate to substrate that is still covered with water. The surface area of the bottom of the reservoir that could be exposed (dewatered) for short periods of time is very small and insignificant compared to the overall area of the reservoir that provides habitat for invertebrates. This condition is not expected to negatively impact the overall invertebrate community of the reservoir.

5.2.2.2 No-Action Alternative

The No-Action Alternative would not change existing conditions for benthic macroinvertebrates.

5.2.3 Fisheries

5.2.3.1 Proposed Action: Water Supply Storage Reallocation

Reallocation of storage for water supply could potentially impact the fisheries component of the aquatic ecosystem during periods of drawdown. Many species present in J. Percy Priest utilize the shallow littoral zone of the reservoir as a primary location to carry out their life cycle. The littoral zone is where the young of many fish species, including sunfish, crappie, and bass forage for invertebrates and smaller fish, and where the majority of the fish spawning occurs. Many game species present in the reservoir create nests to spawn, and water fluctuations could negatively impact the reproductive success of several species. However, very few fish construct nests in water less than 1 foot deep where the nest could be affected by drawdown during extreme drought. Further, water levels as affected by water supply withdrawal would be expected to be lowest during late summer or fall, well after the prime period for fish spawning. Also, the Nashville District will continue to cooperate with the TWRA to maintain stable water levels during the period when the water temperature is optimum (65-70 degrees Fahrenheit) for onset of fish spawning. This generally occurs during the April-May time period. Overall, impacts to fish reproduction during extreme drought conditions are expected to be minor.

5.2.3.2 No-Action Alternative

The No-Action Alternative would not change existing conditions for fisheries resources.

5.3 WATER QUALITY / PHYSICAL AND CHEMICAL CONDITIONS

5.3.1 Proposed Action: Water Supply Storage Reallocation

Chemical constituents such as heavy metals that are bound in the sediment could be released during the times when the reservoir level fluctuates during water reallocation as well as during normal annual drawdowns. The reservoir littoral zone already experiences exposure of the sediment when the water level is lowered annually as part of the current reservoir operation plan. Therefore, no substantive changes to overall water quality are expected from reallocation of storage for water supply. Ongoing patterns of thermal stratification and development of anaerobic conditions in water deeper than 15 to 25 feet would continue.

5.3.2 No-Action Alternative

Under the No-Action Alternative, water quality would continue to exhibit the trend of low dissolved oxygen and high nutrient content that have been apparent during the past several years.

Part of the Reservoir's littoral zone experiences exposure of the sediment and potential release of chemical constituents such as heavy metals, when the water level is lowered as part of the current reservoir operation plan or fluctuates during drought periods; this would continue under the No-Action Alternative.

5.4 WETLANDS

5.4.1 Proposed Action: Water Supply Storage Reallocation

Wetlands would not be expected to be affected by implementation of the Proposed Action, as nearly all wetland areas in the vicinity of the project are located above the summer pool elevation of 490 feet ngvd 1929. Rather, wetlands would be impacted by extreme drought conditions unrelated to water supply withdrawals.

5.4.2 No-Action Alternative

The No-Action Alternative would not result in a change to wetlands in the project area.

5.5 VEGETATION

5.5.1 Proposed Action: Water Supply Storage Reallocation

The Proposed Action would not affect the natural vegetation in the project area.

5.5.2 No-Action Alternative

The No-Action Alternative would not result in a change to vegetation in the project area.

5.6 THREATENED AND ENDANGERED SPECIES

5.6.1 Proposed Action: Water Supply Storage Reallocation

The Proposed Action would not have an adverse impact on threatened and endangered species in the project area. The federally or state-protected plant species that were listed in Section 4.6 of this document are all upland species that occur on project lands that are situated well outside of the reservoir area. The federally listed mussels are located in the East Fork Stones River upstream of the impounded area of J. Percy Priest and would not be affected by reallocation of storage for water supply.

5.6.2 No-Action Alternative

The No-Action Alternative would not result in a change in existing impacts to threatened and endangered species in the project area.

5.7 RECREATION

5.7.1 Proposed Action: Water Supply Storage Reallocation

Implementation of the Proposed Action could affect existing recreational activities at certain locations and times of the year. For example, at Stewarts and Vivrett Creek recreation areas, bank fishing occurs in cove-like settings where the water is fairly shallow; both areas are intensively managed for recreational fishing. During extreme drought conditions, which are rare, the 1-foot drawdown expected due to the water supply storage reallocation could limit the bank fishing opportunities until water levels return to above drought conditions. Other, less shallow, recreation areas could be used for bank fishing as these would be less affected by the maximum 1-foot water supply reallocation drawdown during drought periods.

The 110-acre Couchville Lake that is part of the Long Hunter State Park is directly influenced by water level fluctuations of J. Percy Priest Reservoir and could be affected by the Proposed Action. This park is heavily used for recreation, and has recorded more than 500,000 visitor-use days each year for the past several years. Paddleboats along with other small johnboats are available for rent at the marina. If the water level of the lake is reduced by 1 foot during drought periods, the boaters may not be able to traverse quite as close to the shoreline of the lake to enjoy the scenic beauty of the woodlands that surround the lake. However, hiking and jogging around the trails and paths that surround the lake are other important recreational uses of this area and would not be affected by this action.

Corps-operated recreation areas and commercial marina facilities (Hermitage Landing, Elm Hill Marina, Four Corners, and Fate Sanders Marina) could experience decreased water levels during extreme drought periods. However, launching of boats would not be significantly impaired due to the Proposed Action, which would only lower summer water levels by up to 1 foot. Neither would boats at docks become stranded. Launching ramps and marinas on J. Percy Priest are designed to be useable during winter drawdown of the lake when elevations would be several feet lower than levels resulting from water supply withdrawals.

The maximum 1-foot drawdown resulting from the Proposed Action would not significantly hinder navigation for boaters except during drought periods in some already shallow areas.

5.7.2 No-Action Alternative

The No-Action Alternative would have no impact to recreation in the area.

5.8 CULTURAL RESOURCES

5.8.1 Proposed Action: Water Supply Storage Reallocation

By letter of August 7, l998, in response to project scoping, the Tennessee State Historic Preservation Office determined that the proposed activities would have no effect on properties eligible for or listed on the National Register of Historic Places (Appendix 7).

5.8.2 No-Action Alternative

The No-Action Alternative would have no impact on cultural resources.

5.9 HEALTH AND SAFETY

5.9.1 Proposed Action: Water Supply Storage Reallocation

Implementation of the Proposed Action would provide M&I water users with a safe and reliable supply of water. However, on occasion, discharges of inadequately treated wastewater occur from sewage treatment facilities upstream of the study area. During extreme drought years when water levels are lowest, less dilution of contaminated waste would occur. It is reasonable to expect that wastewater treatment at these facilities will improve over time as individual municipalities and water users upgrade and increase the capacity of their systems.

A drawdown of 1.0 foot below normal summer pool is in the normal operating range of the lake. Boaters would need to be alert to the shallower water depth and underwater hazards that may be exposed, such as submerged stumps, logs, and rocks, with the lower lake elevation. Some boaters have become accustomed to the normal summer lake elevation of 490 ngvd 1929 and thus may need to alter their normal navigation routes that may not provide safe passage with a lower lake elevation.

Hazardous, toxic, or radiological waste that might be present in the project area is not expected to be impacted by the Proposed Action.

5.9.2 No-Action Alternative

The No-Action Alternative would not have any impact on the health and safety concerns beyond those that currently exist.

5.10 SOCIOECONOMICS

5.10.1 Proposed Action: Water Supply Storage Reallocation

The proposed reallocation of storage in J. Percy Priest Reservoir would entail M&I users making a one-time purchase of storage from the project, along with the requirement to make annual payments for their pro-rated share of the joint operation and maintenance costs of the project and their pro-rated share of any major repair and/or rehabilitation costs. The annual payments for operation and maintenance are calculated only for those project features necessary to provide storage of water as are any major repairs and/or rehabilitation. These do not include items such as recreation and power plant maintenance not considered necessary for providing water storage. M&I users currently withdrawing from J. Percy Priest Reservoir are in the process of entering interim contracts that enable them to withdraw water that is surplus to project needs. These interim contracts are a temporary measure to allow users to obtain water until permanent reallocation of storage for water supply is approved. As such, contracts for water surplus do not guarantee that water will be available for M&I withdrawal, and these contracts will expire within a few years. Reallocation of storage for water supply would provide a dependable volume of water for M&I withdrawal that would be guaranteed during the 50-year drought on a 98 percent dependability. Purchases of storage from J. Percy Priest Reservoir would be similar to other water storage contracts in-place nationwide with M&I users and would not result in unfair or inequitable treatment of local users or their customers in comparison with other parts of the nation.

Current estimates of the initial costs of storage for each of the M&I users are:

- City of Murfreesboro, TN - $2.9-$3.2 million
- Town of Smyrna, TN - $2.9-$3.2 million
- City of La Vergne, TN - $1.7-1.9 million
- Consolidated Utility District - $2.1-$2.3 million
- YMCA - $15-$17 thousand

Estimates of annual O&M payments for each of the M&I users for Fiscal Year 2001 are:

- City of Murfreesboro, TN - $17,000
- Town of Smyrna, TN - $17,000
- City of La Vergne, TN - $9,000
- Consolidated Utility District - $10,000
- YMCA - $100

This would translate into an approximate average monthly cost for a typical family of four of $0.34. This average assumes that utilities would spread the initial purchase of storage over the next 30 years and that they would equitably distribute the cost increase among customers on a pro-rated basis (i.e., in proportion to water usage). Since there are large quantity differences among water users, small users (such as households) would experience increases greater than the average.

The cost to the M&I users is based upon the higher of the following:

1. Updated-Joint-Use Cost of Storage – The updated cost of the dam and reservoir less all specific costs such as hydropower, recreation, etc.

2. Hydropower Benefits Foregone – The benefits from hydropower generation that are lost due to the water supply reallocation.

3. Hydropower Revenues Foregone – The loss of revenues to the Federal government loses due to storage being reallocated to water supply.

4. Cost of Replacement Power – The cost to replace the hydropower benefits foregone. When reallocating from the hydropower pool the cost of replace power is equivalent to the cost for hydropower benefits foregone.

In addition to the increased cost of water for each user, impacts from the Proposed Action would include lost hydropower benefits and lost revenue from hydropower generation. Hydropower is generated at J. Percy Priest Reservoir as water is available within the constraints of other purposes including flood storage, recreation, and water quality. Hydropower losses provide the basis of establishing the cost of storage in J. Percy Priest Reservoir and are partially offset by return flows from M&I withdrawals as these return flows are added back into the inflow hydrograph for J. Percy Priest Reservoir. J. Percy Priest Reservoir hydropower operations are already highly variable during summer and fall months, with prolonged periods of no hydropower generation occurring more frequently than at other projects in the Nashville District. This is due to low inflows to the reservoir such that evaporation often exceeds inflow during dry months.

Lost hydropower constitutes a loss of benefits to the users and a loss of revenue to the U.S. Treasury, as power generated at J. Percy Priest Reservoir is marketed through the Southeastern Power Administration (SEPA – U.S. DOE) to various utilities, with receipts from power sales going into the U.S. Treasury. The annual loss of hydropower benefits to the hydropower users due to a 1.0 mgd withdrawal at J. Percy Priest Reservoir would be $12,401. The annual loss of revenue due to a 1.0 mgd withdrawal at J. Percy Priest Reservoir would be $3978. The relatively small amount of power lost must be supplied from alternative energy sources, which would likely have higher costs to produce the same amount of power than at J. Percy Priest Reservoir. This added cost would be spread among all electrical power consumers, much as the added costs of water described above. The small cost that would be added an individual consumer's electric bill due to reallocation of storage at J. Percy Priest Reservoir would be essentially unnoticeable. However, the amount the M&I user will pay for storage will take into account the lost revenue from hydropower, and this amount will go into the U.S. Treasury.

To be eligible for purchase of storage for M&I purposes, withdrawal from a Corps of Engineers reservoir must be the lowest cost alternative for meeting the user's needs. Therefore, implementation of the Proposed Action would result in the smallest cost increase to customers of the M&I users needing additional water. Further, because the M&I users on J. Percy Priest Reservoir already have infrastructure (intakes, treatment plants, pipelines, etc.) in place or under development, there would be no additional costs for these items as there would be with alternative water sources. The proposed reallocation would likely result in a more dependable source of water for M&I users than would other alternatives. In general, ground water is not available in sufficient quantities in middle Tennessee to meet the needs of M&I users. Surface impoundments are expensive and difficult to implement due to environmental concerns, and costs to mitigate the environmental impacts may increase development costs to unreasonable levels. Also, design treatments to ensure a reliable source of water during dry periods would be a consideration in Karst topography.

Indirect impacts of reallocation of storage from J. Percy Priest Reservoir would include likely continued growth of communities supplied from J. Percy Priest Reservoir, along with environmental, cultural, and socioeconomic impacts resulting from such development. Communities surrounding Metropolitan Nashville and Davidson County are experiencing significant growth already, and provision of a reliable source of water would remove one possible limiting factor to continued growth. However, water supply is just one of many factors that influence development patterns, and available water sources alone would not stimulate development. Minor socioeconomic losses could result from lower water levels and reduced recreation on J. Percy Priest Reservoir during extreme drought periods. However, these periods would be very infrequent and of generally short duration such that those impacts should not be significant.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires Federal Agencies to consider whether their actions would result in disproportionately adverse impacts to minority and/or low-income populations. Because the Proposed Action would have effects spread equitably across the entire economic spectrum of the community, there would be no disproportionate impacts to minority or low-income populations.

5.10.2 No-Action Alternative

Under the No-Action alternative, M&I users with existing intakes in J. Percy Priest Reservoir would be forced to find alternate sources of water that would have higher costs than use of J. Percy Priest Reservoir. This would result in additional construction of facilities and would provide a short-term stimulus to local economies. However, over the long-term, the effects would likely be restricted growth and development opportunities, as water became a limiting factor. This would displace development to other areas. Consumers would likely be faced with higher water bills than under the Proposed Action. Alternate sources of water may also be less reliable than J. Percy Priest Reservoir, and the reduced reliability may require periodic curtailment of certain water uses. Conversely, under the No-Action alternative, there would be no impacts to hydropower generation or recreation at J. Percy Priest Reservoir.

The No-Action Alternative is not expected to result in disproportionate adverse impacts to minority or low-income populations.

5.11 LAND USE / AESTHETICS

5.11.1 Proposed Action: Water Supply Storage Reallocation

The Proposed Action would not have any adverse impact on existing land uses of the J. Percy Priest project. However, in certain areas of the reservoir there could be exposed mud flats, especially in the shallower coves such as in the Vivrett Creek area during extreme drought periods when the water level is drawn down by 1 foot. This visual effect would be substantially less than occurs annually during drawdown. Land uses off project lands may be subjected to continued development pressures with provisional adequate and reliable water sources.

5.11.2 No-Action Alternative

The No-Action Alternative would have no impact to existing land use or aesthetics of the J. Percy Priest project. If no water storage were to be reallocated to M&I users, development pressures related to growth could be restricted, thus reducing secondary impacts. Alternatively, development pressures may continue if reliable sources of water (other than J. Percy Priest) were to be developed.

5.12 TRANSPORTATION

5.12.1 Proposed Action: Water Supply Storage Reallocation

The Proposed Action would not have any adverse impacts to transportation or other traffic safety-related issues. No new roads would be built nor need to be upgraded as a result of the Proposed Action.

5.12.2 No-Action Alternative

This alternative would not directly result in a change in existing roadways, traffic levels or patterns, or safety issues.

5.13 AIR QUALITY

5.13.1 Proposed Action: Water Supply Storage Reallocation

No direct changes in emissions are expected as a result of the Proposed Action. Therefore, air quality permitting and emission standard regulations are not applicable to the project. Indirect changes in emissions resulting from growth patterns that in part have created the need for the Proposed Action would likely continue. These, however, are subject to regulation under the Clean Air Act. The Proposed Action is considered consistent with programs for maintaining compliance with ambient air quality standards.

5.13.2 No-Action Alternative

The No-Action Alternative would have no impact to existing air quality.

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6.0 ENVIRONMENTAL COMMITMENTS

The Corps will continue to employ the BMPs associated with the operation of the J. Percy Priest Reservoir. Of particular importance is the maintenance of a stable reservoir pool level during the fish-spawning season, and during the time when the recreation use of the reservoir is at its maximum. Examples of BMPs include:

- Cooperation with the TWRA to hold water levels stable during a two-week period when the water temperature is optimum for fish spawning to the extent possible.
- Maintenance of a stable pool elevation with relatively minor fluctuation during the months of heaviest use (May to October) to realize full recreation potential. The current operating agreement between the Corps, TVA, and SEPA allows for a 1-foot fluctuation of the recreational pool between elevation 489.5 feet ngvd 1929 and 490.5 feet ngvd 1929 (0.5 foot above and below normal pool at 490 feet ngvd 1929). However, shoreline vegetation is adversely affected when the pool is allowed to remain above 490 feet ngvd 1929 for more than 2 or 3 days. Since shoreline vegetation is very important for fish habitat, erosion control, and aesthetic value, inundation above 490 feet ngvd 1929 will be prevented to the extent possible.

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7.0 AGENCY COORDINATION AND ENVIRONMENTAL COMPLIANCE

Coordination of the proposed water reallocation at J. Percy Priest included issuance of a public notice as part of the scoping process (see Appendix 6). In addition, the draft EA is being circulated for agency and public review. Compliance with environmental laws and regulations required for the Proposed Action are identified below.

7.1 CLEAN WATER ACT

Compliance with Section 404 of the Clean Water Act is required for discharge of dredged or fill material into the waters of the United States, including adjacent wetlands. Typical activities requiring Section 404 permits include:

- site development fill for residential, commercial, or recreational developments,
- construction of revetments, groins, breakwaters, levees, dams, dikes, weirs, and intake structures, and
- placement of riprap and road fills.

A Public Notice is distributed to all known interested persons, and to agencies with jurisdiction by law or special expertise. The Corps performs a public interest review, evaluating all comments and information received during the comment period and evaluating the proposal under the EPA Section 404(b)(1) Guidelines. A permit is issued unless the proposal is found to be contrary to the public interest.

Reallocation for storage of water supply at J. Percy Priest is not subject to regulation under the Clean Water Act, and existing intakes have already been approved under Section 404. However, the Department of the Army permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act may be necessary for future individual M&I withdrawals. If so, these applications will be processed in accordance with regulations in effect at that time.

7.2 FLOODPLAIN MANAGEMENT

Executive Order (EO) 11988 (May 24, 1977) outlines the responsibilities of Federal agencies in the role of floodplain management. In accordance with this EO, the Corps is required to evaluate the potential effects of actions on floodplains, and does not undertake actions that directly induce growth in the floodplain, unless no practical alternative exists. Construction of structures and facilities on floodplains must incorporate flood proofing and other accepted flood protection measures. Agencies must attach appropriate use restrictions to property proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties.

The proposed Action would indirectly support continued growth of communities supplied from J. Percy Priest Reservoir, but would not necessarily directly or indirectly induce growth in the floodplain. Communities surrounding Metropolitan Nashville and Davidson County are already experiencing significant growth, and provision of a reliable source of water would remove one possible limiting factor to continued growth.

7.3 FISH AND WILDLIFE COORDINATION ACT

The Corps is required to coordinate water resource projects with the USFWS and TWRA under the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). As an operation and maintenance action, coordination was initiated with the scoping notice for the proposed reallocation. The draft EA is being sent to both agencies for review. Any comments received from them will be given great weight in accordance with the Act.

7.4 ENDANGERED SPECIES ACT

The Endangered Species Act requires the determination of possible affects on or degradation of habitat critical to federally-listed endangered or threatened species. This assessment examines these issues through review of occurrence records of plants and animals that are on federal and state lists, and a review of the project area for the presence of the types of habitats that could support listed species. These investigations did not indicate the presence of any listed threatened or endangered species or supporting habitats that would be impacted by the Proposed Action. Thus, the Corps has reached a “no affect” determination concerning endangered species impacts of the proposed reallocation. See Appendix 6 for a letter from the USFWS documenting completion of actions necessary for compliance with the Endangered Species Act.

7.5 NATIONAL HISTORIC PRESERVATION ACT

The National Historic Preservation Act requires consideration of the effects of Federal undertakings on historic properties. The Act also requires Federal agencies to provide the Advisory Council on Historic Preservation an opportunity to comment on undertakings through the process codified in the Council's regulations (36 CFR 800). In compliance with this requirement, the Tennessee SHPO determined that the proposed water storage reallocation will have no effect upon National Register of Historical Places-listed or -eligible properties.

7.6 HAZARDOUS, TOXIC AND RADIOLOGICAL WASTE

Hazardous, toxic, and radiological waste that might be present in the project area is not expected to be encountered or impacted by the Proposed Action.

7.7 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* was signed on February 11, 1994. The order requires Federal agencies to promote “nondiscrimination in Federal programs substantially affecting human health and the environment.” In response to this direction, Federal Agencies must identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

During preparation of this assessment, the three-county project area was evaluated to identify the minority and low-income populations in the project area. The minority residents in the project area represent about 27% of the total population based on the 1994 census. The minority population consists of representatives from African-American, Hispanic, American Indian, Eskimo, Asian, and Pacific Islander cultures. The census figures do not provide information on the local level of detail for the project area; therefore it is not possible to identify locations with a preponderance of low-income or minority residents. It is assumed that the low-income and minority residents are distributed throughout the counties in the project area.

The final step in the environmental justice evaluation process is to evaluate the impact of the project on the population and to ascertain whether target populations are affected more adversely than are other residents.

- The potentially negative impact of the project would be the increases in the water rates that could be imposed by the water districts using storage and withdrawing water from the reservoir. The water rates could increase as a result of the project since the Nashville District must begin to charge municipalities, water districts, and industries for water storage in the reservoir. It is assumed that M&I users would pass on the increased cost of water proportionate to water usage such that no component of the population would be disproportionately affected.
- The positive effect of the project would be to ensure a continuous, uninterrupted supply of finished water to meet the needs of M&I customers, while enjoying growth and prosperity in the region.
- The requested users would all receive the benefits of the storage without regard to income or race.

7.8 CLEAN AIR ACT

The EPA defines ambient air in CFR40, Part 50, as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the Clean Air Act (CAA) and the 1977 and 1990 Amendments (CAAA), EPA has promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare. To date, EPA has issued NAAQS for six criteria pollutants; carbon monoxide, sulfur dioxide, particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers, ozone, nitrogen dioxide, and lead. Areas that are below the standards are in “attainment,” while those that equal or exceed the standards are in “non-attainment.”

The CAA and CAAA require the Corps to comply with all applicable parts of these acts and applicable standards. The project area in Davidson, Wilson, and Rutherford Counties is currently in attainment for air quality. The Corps’ Proposed Action would not impact the attainment status of these counties and would be in compliance with the CAA Conformity Rule.

8.0 SCOPING AND PUBLIC CONCERNS

8.1 PUBLIC INVOLVEMENT

Preparation of the EA included agency and public notification of the intent to implement a Proposed Action, and an opportunity for agency and public review and comment on the Proposed Action prior to agency decision making. A combination Public Notice and scoping letter was issued on July 8, l998, which described the project alternatives (Appendix 6). The letter was sent to local, state, and federal governmental agencies with responsibilities for activities within the study area or those that have an interest in the project.

8.2 SCOPING RESPONSES

Three responses were received from the public notice:

- the Tennessee State Historical Commission stated that the project would have no effect upon National Register of Historic Places-listed or -eligible properties
- the USFWS comments submitted under the Fish and Wildlife Coordination Act indicated that no significant adverse effects to fish and wildlife, their habitats, and human uses thereof are expected to result from the proposal. The USFWS also indicated that, based on the best information available at this time, the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled.
- Phillip M. George, City Attorney for the Town of Smyrna, Tennessee requested that Smyrna be "excluded from any water storage charges". Specific M&I user fees are not a NEPA issue, but socioeconomic impacts are discussed in Section 5.10 of this Environmental Assessment.

The above responses are provided in their entirety in Appendix 6.

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9.0 SUMMARY

The Corps of Engineers manages water supply contracts for M&I users withdrawing water from agency reservoirs throughout the United States under Public Law 85-500, and has more than 240 contracts that are in place. The Nashville District has a directive to enter into water storage contracts with the current and future M&I users in the vicinity of J. Percy Priest Reservoir (and other reservoirs throughout the District). The Nashville District has completed an evaluation of the anticipated needs of the M&I users and has determined that there is storage in the reservoir that can be reallocated to meet those needs without seriously impacting the authorized purposes of the reservoir. This EA has addressed potential impacts of the Proposed Action, as well as the No-Action Alternative as follows:

Proposed Action

- the Proposed Action would provide M&I water users with a safe and reliable supply of water
- the Water Storage Reallocation Alternative would allow M&I users to meet existing and future water requirements in a cost-effective manner
- this Alternative would allow growth to continue in the region
- the Proposed Action would establish a share of the operation, maintenance, repair, and replacement costs of the J. Percy Priest Reservoir to be paid by M&I users
- the approximate average monthly cost for a typical family of four would be insignificant, about $.34
- the Proposed Action is environmentally sensitive to the natural resources in the project area and will not significantly impact any important natural or cultural resources or other elements of the human environment
- the reservoir drawdown that would be experienced is expected to be about 1.0 foot, which is in the normal operating range of the lake

No-Action Alternative

- this Alternative does not comply with Public Law 78-534 unless M&I users are forced to discontinue withdrawals and find other sources of water
- the M&I water users would still be required to pay for finished water withdrawn from J. Percy Priest Reservoir
- growth and prosperity of the region could be restricted if alternative sources of water are more costly than withdrawals from the reservoir
- environmental impacts of development of alternative water supplies for each M&I user would likely be more adverse than under the Proposed Action

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APPENDIX 1

PHYTOPLANKTON INFORMATION

APPENDIX 2

BENTHIC INVERTEBRATES INFORMATION

APPENDIX 3

FISH INFORMATION

APPENDIX 4

WATER QUALITY INFORMATION

APPENDIX 5

LIST OF RARE SPECIES BY COUNTY – DAVIDSON, RUTHERFORD, AND WILSON

APPENDIX 6

SCOPING DOCUMENTATION